

each was perfect, and in no way rubbed or injured; the scorpions appeared healthy, and carried their tails in the usual position. The sepoy asserted that he possessed the juice of a bulbous root, which, when applied to a fresh-caught scorpion, prevents it for the future from stinging; he also mentioned that several of his family possess the same secret, but from the manner in which he evaded my questions respecting the bulbous root, I am inclined to doubt that portion of his assertion.

The domestic animals of Dacca are precisely similar to those found at Barrackpore, with the exception of one solitary animal worthy of attention, and which is called the Dacca Cow; they are highly prized by natives, and the breed is not known to many. All that I can gather respecting the history of this domesticated animal is, that it is a breed introduced years ago; but when, and from what locality, no one knows. The colour is invariably of a pure white, the tail long and bushy at the end; the animal is of a small size; eyes large, full and dark; skin round the eyes of a pinkish hue, the same colour prevails on the muzzle; they do not give any large quantity of milk, but are prized highly as a breed, by the natives of the higher class. The males are similar to the cow in appearance, both possessing little or no symptoms of a hump. It is very rarely that these cattle are permitted to leave the houses in which they are kept, nor are they ever seen grazing in the fields; that they are totally different from the cattle of the country is beyond a doubt, and I regret that I could gain no satisfactory information about them.

The jungles of Dacca abound with insects, nor have I seen a finer field for the naturalist than this part of Bengal presents; the unhealthiness of the place, however, precludes all pleasure from visiting it as a matter of choice. With these few brief observations I now conclude my observations on the fauna of Dacca, simply mentioning that on my return to Calcutta by water, *viâ* the Soonderbunds, I saw great numbers of *Blagrus leucogaster* and *Halcyon amauropterus*; both species were extremely abundant.

XIX.—*A Reply to some Statements of Dr. Williams on the controversy respecting the Branchial Currents in the Lamellibranchiata.* By JOSHUA ALDER, Esq.

To the Editors of the Annals of Natural History.

GENTLEMEN,

I HAVE read with much interest the series of papers "On the Mechanism of Aquatic Respiration in Invertebrate Animals,"
Ann. & Mag. N. Hist. Ser. 2. Vol. xiv. 12

by Dr. Williams, which have appeared from time to time in your Journal. That on the Mollusca, however, published last month, contains some statements, which, as they are not founded on fact, and are likely to be injurious to the scientific reputation of a brother naturalist, I take the liberty of endeavouring to correct. I allude to the remarks on Mr. Hancock. Dr. Williams gives that gentleman due credit for most of his investigations into the mechanism of respiration in the Bivalves, but against that praise he sets off certain errors which he alleges Mr. Hancock has committed, as follows:—"By Mr. Hancock, representing one class of observers, it is maintained that the inhalent current is set in motion exclusively by the action of vibratile cilia seated on the lining membrane of the siphon itself. By Mr. Clark this explanation is denied. The former naturalist rests his theory upon the alleged demonstration of cilia on the *internal* surface of the inhalent siphon, the latter upon observation of the currents." "Mr. Hancock is undoubtedly in error in stating that the water entering this cavity is drawn in by cilia of the siphon. The microscope disproves completely the assertion that the internal lining membrane of the inhalent or extra-branchial siphon is the scene of ciliated epithelium." And concerning the exhalent current it is stated, "The uninterruptedness of this current was supposed by Mr. Hancock to be due to the action of *cilia* lining the interior of the siphon. The statement of this distinguished naturalist in this particular is indisputably erroneous. This siphon, like the in-current one, is *not* lined with vibratile epithelium." Again, we find it stated that "Mr. Hancock is inaccurate in affirming that *all* the water which enters this cavity travels *exclusively* along the inhalent or extra-branchial siphon, and never, under any circumstance, through either the ventral or pedal openings."

Mr. Hancock has made none of the statements here imputed to him. The only place where any of his opinions concerning these points are expressed is in a joint paper with myself, "On the Branchial Currents in *Pholas* and *Mya*," read at the British Association Meeting in 1851, and afterwards published in your Journal*. Certainly no such statements are there made: indeed the subject of cilia lining the siphons is not at all alluded to. Dr. Williams, however, speaks of Mr. Hancock's controversy with Mr. Clark, from which, and his not mentioning my name in connexion with it, I am led to infer that he attributes to Mr. Hancock a series of letters that I wrote in your Journal on the subject. These letters bear my signature, and for anything therein contained, I alone am responsible. Presuming that

* 2nd Ser. vol. viii. p. 370.

Dr. Williams has made this mistake, I may be permitted to say that he has not correctly stated the opinions there advocated. The letters arose from the denial by Mr. Clark of the correctness of a statement I made in a notice of *Kellia rubra*, that the anterior tubular fold in that species performed the office of an ingress siphon. The controversy arising out of it led to the expression of our different views on the theory of branchial and siphonal currents. I contended for the reception and discharge of these currents by separate apertures (or in separate portions of the cloak where two apertures do not exist), and that by the action of cilia; but not by the cilia lining the siphons *alone*, as will be evident from the following extracts. In the first letter my views are thus stated:—"The inhalent is always kept distinct from the exhalent current, and admitted by a separate aperture from that by which the latter is expelled. This seems to be necessary, as the currents, being caused by the motion of the *branchial cilia*, and not by the expansion and contraction of the walls of a cavity, are continuous in one direction*." In my second letter I add a note to this effect:—"The internal surface of these siphons is usually (perhaps always) covered with vibratile cilia, more minute than those of the branchiæ, but *acting in conjunction with them* in producing the currents. Mr. Cocks informs me that he can see the cilia in the anterior tube of *Kellia suborbicularis*, with a lens of $\frac{1}{4}$ inch focus†." These statements surely cannot be taken to imply that the currents are produced by the cilia lining the tubes *alone*; and where does Dr. Williams find Mr. Hancock's "alleged demonstration of cilia" on these organs? The existence of cilia lining the internal walls of the siphons had been previously noticed by Mr. Garner‡ and other authors; and notwithstanding the decided opinion now given by Dr. Williams against this view, I still believe that it is correct; but however this may be, the well-earned scientific reputation of Mr. Hancock cannot be brought in question by the result.

With respect to the apertures by which the water is admitted, I have stated, from the evidence of repeated observations (and in this Mr. Hancock's observations agree with my own), that the regular current for the supply of the branchiæ passes in by the branchial siphon, when it exists, and instances are adduced where, when a strong current was passing in by that siphon, no motion of the water was perceptible opposite the pedal opening. We have nowhere asserted, however, as stated by Dr. Williams, "that *all* the water travels *exclusively* along the inhalent siphon,

* Ann. Nat. Hist. 2nd Ser. vol. iii. p. 384.

† 2nd Ser. vol. iv. p. 51.

‡ Charlesworth's Mag. Nat. Hist. vol. iii. p. 298.

and never, under any circumstance, through the ventral or pedal opening." On the contrary, I admit the flowing in of water through all the apertures (not voluntarily closed) as a natural consequence of the opening of the valves*, which action the animal has of course frequent occasion to perform. I have stated, too, in recording my observations on *Turtonia minuta*, that "at first the water was observed to pass into the widely-open mantle of this little mollusk at all parts of the base of the shell †;" and that "in *Montacuta bidentata* the principal ingress current is decidedly anterior, though the water is admitted occasionally through the whole length of the open mantle ‡." The occasional expulsion through all the orifices is treated as an acknowledged fact throughout; the only reservation I make is that it must be considered an occasional action, unconnected with the regular branchial currents. Mr. Hancock has also distinctly stated in his paper on *Chamostrea* that, when the valves are suddenly closed and the siphons withdrawn, the contained water will escape by the pedal opening and the minute fourth opening, which is found in this and some other bivalves with closed mantles §. In our joint paper "On the Branchial Currents in *Pholas* and *Mya*," a description is given of the action of the currents, observed in an individual of *Mya arenaria*, in situ. This instance is adduced in illustration of the general law of the distinct and simultaneous action of separate currents through the siphons. The question of occasional action under different circumstances or in other families is not gone into, so that no such extreme opinion on this matter as Dr. Williams attributes to Mr. Hancock, can, by any fair construction of words, be deduced from it. Indeed the holding of such opinions we both distinctly deny. Concerning this joint paper I take the opportunity of stating that, Mr. Clark having brought forward the non-connexion of the branchial and anal chambers in *Pholas* as a proof that the currents could not pass in at one siphon and out at the other, I felt myself unable, from the want of sufficient skill in delicate anatomical investigations, to give a correct solution of the difficulty, though aware of the fact of communication from repeated observation of the currents. I therefore had recourse to the assistance of my friend Mr. Hancock. The result was the discovery of the communication existing through the minute network of the gills, which Dr. Williams rightly attributes to Mr. Hancock. He considers it very extraordinary, however, that Mr. Hancock should not have been aware of the discovery of the same fact by Dr. Sharpey, published ten years

* Ann. Nat. Hist. 2nd Ser. vol. iv. p. 49.

† Vol. iv. p. 243.

‡ Vol. v. p. 211. § Vol. xi. p. 106.

before. The pointed manner in which this is put may suggest to some persons a doubt on the subject. But why should Dr. Williams express so much surprise in this instance, when he must know that Dr. Sharpey's discovery has been overlooked by every subsequent writer on the œconomy of the Lamellibranchiata up to the present time? Nay, there appears some reason to believe that Dr. Williams himself may have been amongst the number, for at the same Meeting of the British Association at which our paper, now acknowledged to contain the true theory of branchial action, was read, a paper by Dr. Williams on the same subject was also read, in which it is stated as the result of his researches, "That the branchial siphon acts in drawing in water into the chamber of the mantle by the dilating of the valves of the shell;" and "That a part of the water which is thus drawn into the branchial chamber is swallowed, and eventually rejected by the faecal orifice, and that the rest is expelled by the orifice in the mantle, and in part by the branchial orifice*." Had Dr. Williams been then aware of Dr. Sharpey's discovery of the passage of the water through the gills, he could scarcely have had recourse to the extraordinary idea that the water found its way into the anal chamber through the intestine. Curiously enough, it is announced in the same paper as another of the conclusions come to, "That in *Pholas* the siphons are richly lined with vibratile cilia, as well as the branchial plates."

There can be no doubt, now that the passage is pointed out, that Dr. Sharpey had got hold of the true explanation of the branchial currents, in examining the common Mussel, and that the right of priority must be assigned to him. That his discovery has remained so long unnoticed probably arises, partly from its being introduced under the head of 'Cilia,' where we should not expect to find new views on the structure and œconomy of the bivalve mollusks, and partly from the modest manner in which the facts are stated, without attention being drawn to the points where they differ from the accounts of other observers. For ourselves it may be necessary to say, that we had not seen the article by Dr. Sharpey, as in the library we consult for books not in our own, that of the Literary and Philosophical Society of Newcastle, the volume of the 'Cyclopædia of Anatomy,' containing the article 'Cilia,' was lost in 1848 (before we turned our attention to the subject) and has never been replaced. Had we known that it contained any original matter on the œconomy of the Bivalves, we should certainly have made a point of procuring a sight of it, as we have done since the appearance of Dr. Williams's remarks.

* Report Brit. Assoc. for 1851, p. 82.

My sole object in the present communication being to vindicate Mr. Hancock from the charges of error brought against him, which I trust I have now done satisfactorily, I shall leave the discussion of controverted points to some future opportunity.

I am, Gentlemen,
Your obedient servant,

JOSHUA ALDER.

Newcastle-upon-Tyne, 19th August 1854.

XX.—On the Genus *Lycium*. By JOHN MIERS, Esq.,
F.R.S., F.L.S. &c.

[Continued from p. 141.]

2. MESOCOPE. *Corolla infundibuliformis, limbi laciniis dimidium tubi superantibus, sed ejus longitudinem non excedentibus.*

A. GERONTOGÆ.

* *Stamina lævia.* Sp. 39 ad 41.

39. *Lycium Barbarum*, Linn. ex parte, non aliorum; Dunal in DC. Prodr. xiii. 511, cum synonymiis variis ibi relatis.—In Persia Australi, Scinde et Afghanistan.—*v. s. in herb. Hook.* Abouschir (*Aucher Eloy*, n. 5037).—Dalechi, distr. Abouschir (*Kotschy*, n. 166).—Afghanistan (*Griffiths*, n. 670 et 672).—Scinde, Kurdigass (*Dr. Stocks*, n. 995).

This species was well distinguished by Linnæus, though confounded by other botanists and horticulturalists with *L. vulgare* and *L. Europæum*, from which it is marked by very peculiar characters. It is very spinose, with flexuose, knotty, crooked branches, its splitting bark being of a glaucous whitish or brownish hue; the nodes are large and very prominent, often woolly: the leaves, three to five in each axillary fascicle, are linear, obtuse, spatulate at base, diminishing into a short slender petiole; they are 5 to 10 lines long and 1 to 1½ line broad; three to five flowers spring out of each fascicle; the peduncle is very slender, 5 lines long; the campanular and somewhat scarious calyx is very thin in texture, of a pale glaucous hue, is 1½ line broad and long, at first with five short minute teeth, but they become irregularly cleft into one, two, or three longer fissures: the corolla is thin in texture, funnel-shaped, the tube, contracted a little above the base, being 3 lines long, and the five equal, smooth, oblong segments of its border being 2 lines in length: the stamens inserted below the middle of the tube are quite smooth, one being shorter, reaching the mouth, while the other four are